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Emerging Technologies in Image Processing

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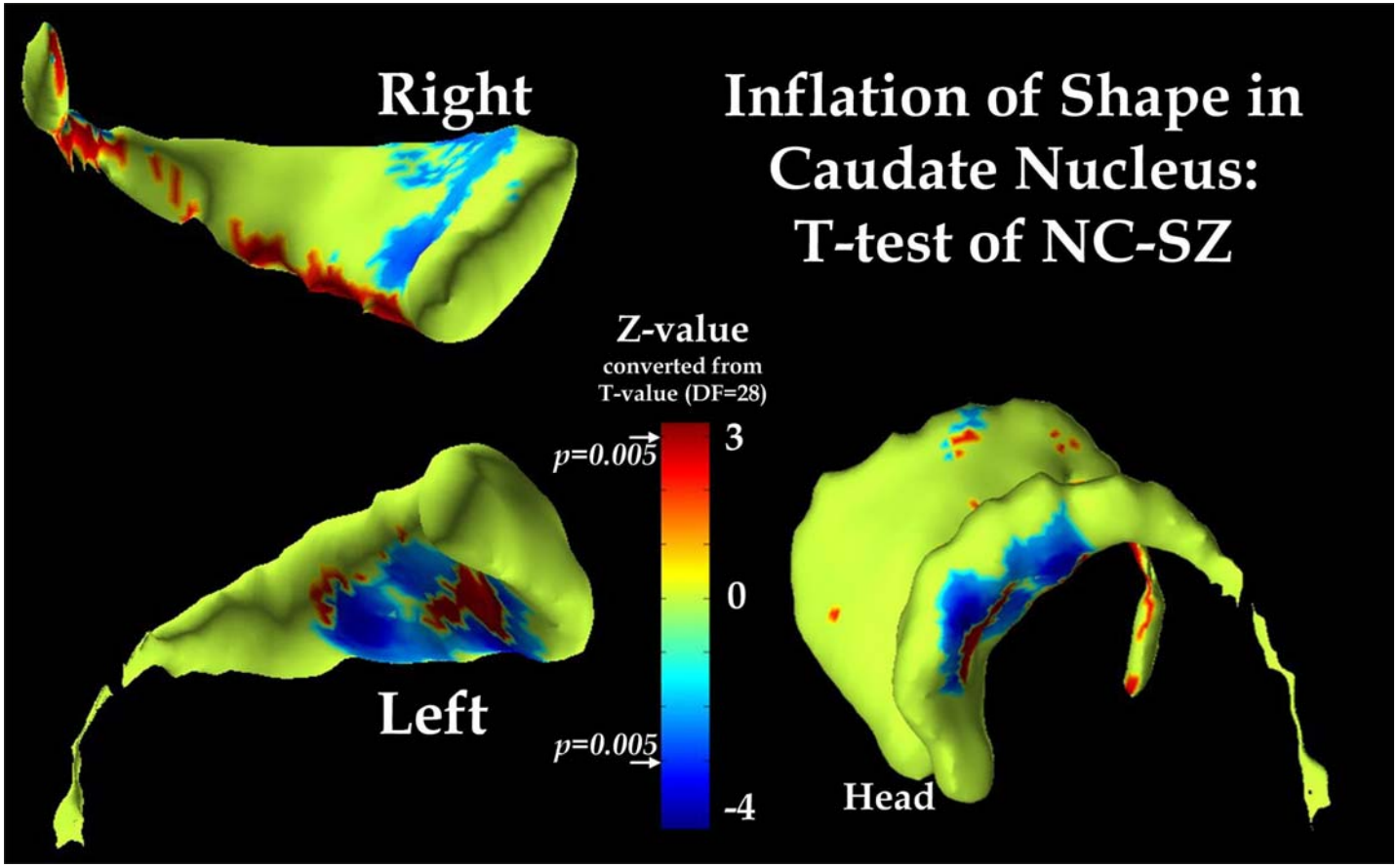
Quantitative Shape Description

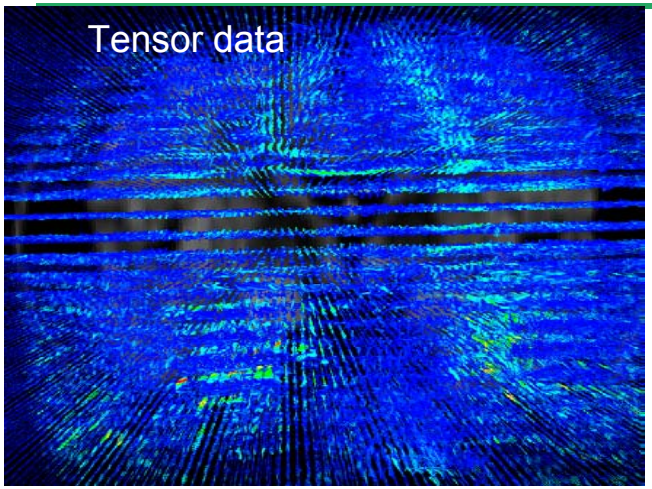


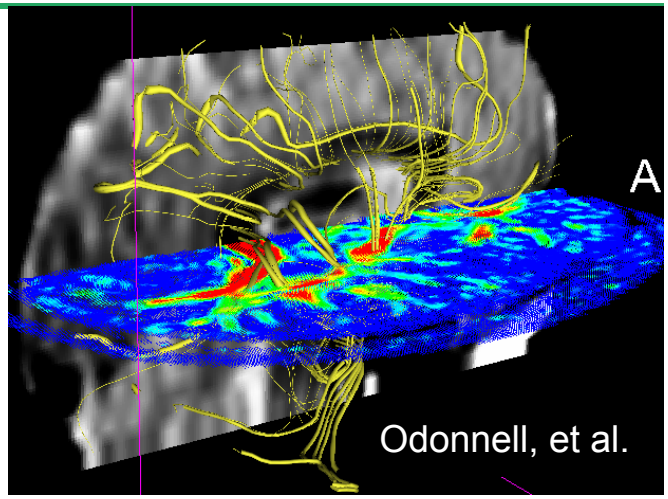
Hae-Jeong Park, Ph.D, James Levitt, M.D., Robert, W. McCarley, M.D. & Martha E. Shenton, Ph.D.

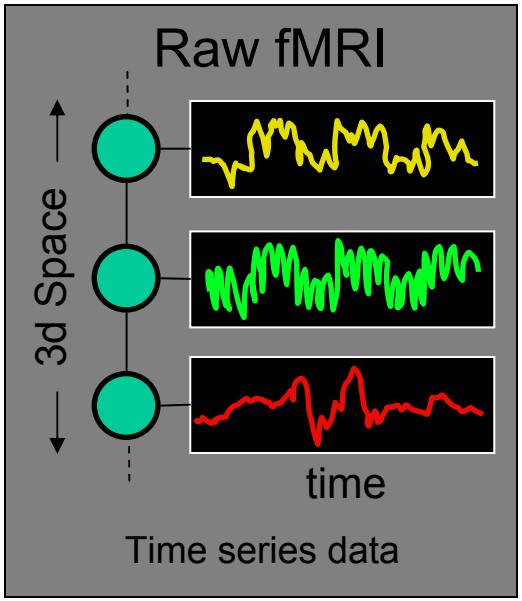
Quantitative Shape Description

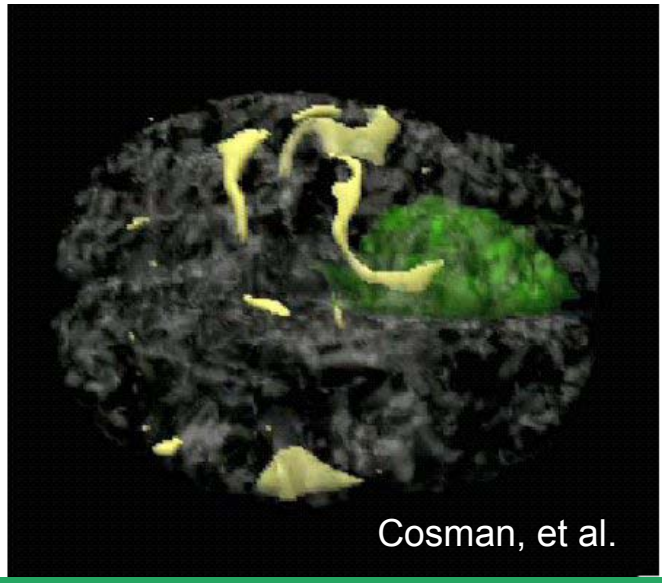
- Techniques for quantitative description of shapes are in the early stage.
- Significant basic research and algorithm development will be needed to develop stable and robust methodologies.

Complex Data





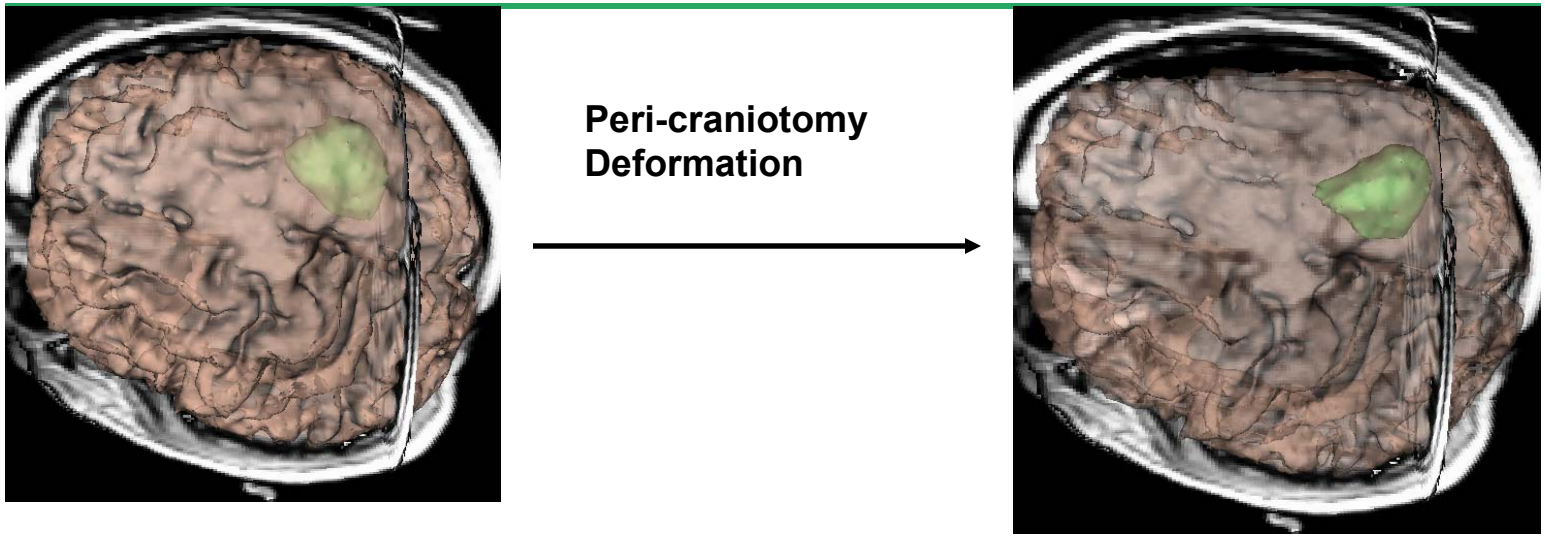


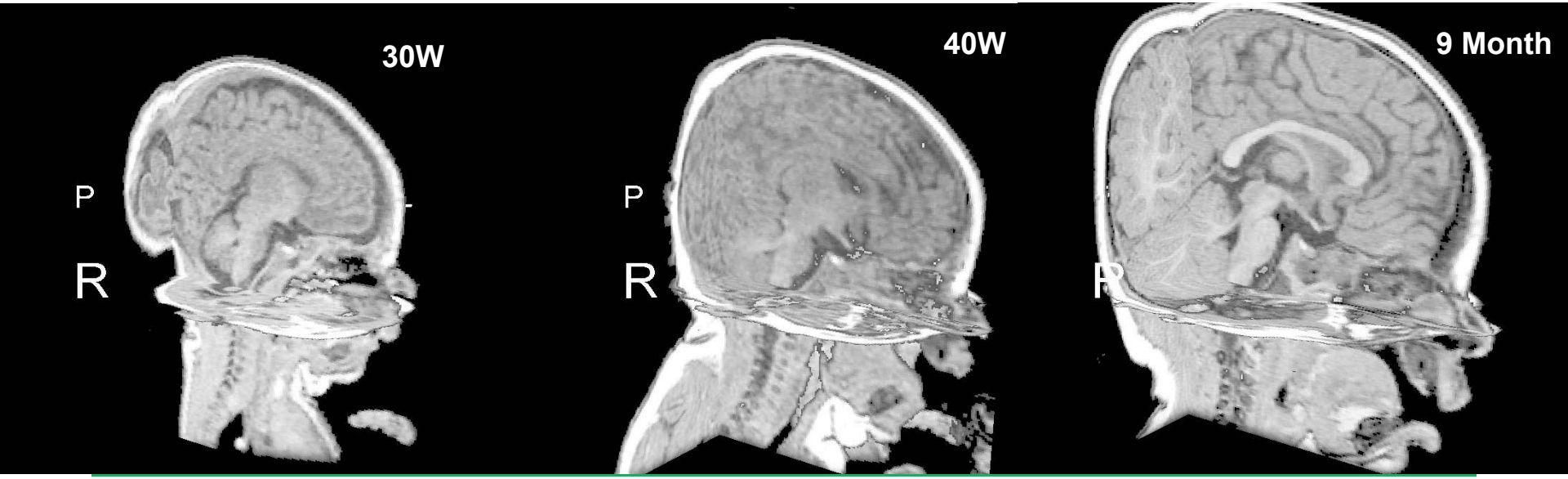


Complex Data

- Complex data sets have specialized requirements for post-processing.
- Complex Data are often noisy and require algorithms that are robust against noise.
- Analysis models need to exploit temporal and spatial contiguity.

Complex Behavior of Structures



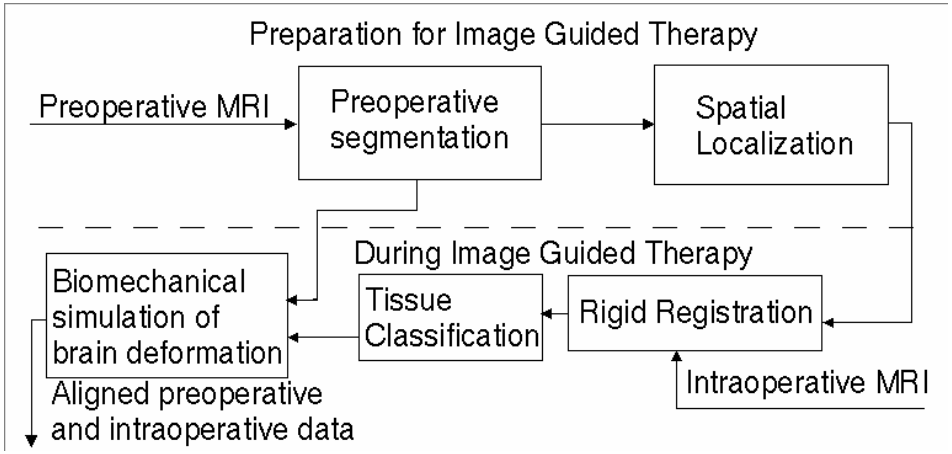


Provided by Warfield et al.

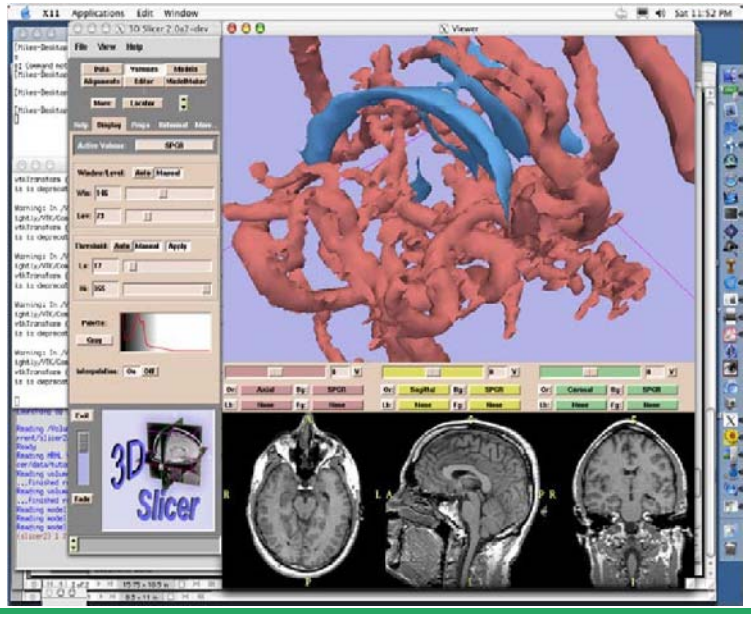
Complex Behavior of Structures

- Dynamically changing anatomical structures require new methods of quantitative analysis.
- Research is needed to optimize methods such finite element analysis

Software Systems



Processing Pipelines



Visualization Systems

Software Systems

- Public domain, open source toolkits enable synergisms between researchers
- Novel support and review mechanisms are necessary

Recommendations:

- Develop
  - New methods for quantitative shape description
  - Algorithms that take advantage of spatial and temporal continuity in time-series data
  - Algorithms to model and analyze dynamic processes
- Open source software systems are critical for basic research and image guided therapy
- Establish appropriate funding and review mechanisms; the current system does not work